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EXAMINER

FAN, CHIEH M

ART UNIT PAPER NUMBER

2634

DATE MAILED: 11/17/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/510,861

Applicant(s)

TAMURA, KOICHI

Examiner

Chieh M Fan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 and 25-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 15-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1,4-7,10,12 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 1-10 and 15-24) in Paper No. 11 is acknowledged.

Information Disclosure Statement

2. The applicant submitted plural IDS's in the present application. Some references have been listed twice in the IDS's. The duplicated references have been crossed out in the IDS's.

Claim Objections

3. Claims 2-5 and 16-19 are objected to because of the following informalities:
Regarding claim 2, "said base band" in line 16 should be changed to --- said base band signal ---.
Regarding claim 3, "said base band" in line 17 should be changed to --- said base band signal ---.
Regarding claim 16, "said base band" in line 14 should be changed to --- said base band signal ---.

Regarding claim 17, "said base band" in line 15 should be changed to --- said base band signal ---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 5 and 19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 5, independent claim 1 recites "phase shifting means for causing phase shift of one of said digital transmission signal and said base band signal..." in lines 9-10 and claim 2 recites "a phase shifter for causing phase shift of said base band (signal) ... " in lines 15-16. On the other hand, claim 5 recites "said phase shifter causes phase shift of said digital transmission signal..." in lines 2-3. The limitation recited in claim 5 results in the phase shift of both the digital transmission and the base band signal, which clearly contradicts the limitation recited in claim 1. Further,

the specification of the present application never teaches both the digital transmission and the base band signal are phase shifted.

Claim 19 is a corresponding method claim of claim 5, and is rejected for the same reason above.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-10 and 15-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the limitation "a preliminary known signal being inserted in said digital transmission signal upon transmission" recited in lines 3-4 is not understood. Do you mean the known signal is inserted in the digital transmission signal once the digital transmission signal is transmitted? Further, claim 1 recites the limitation "said known signal after digital conversion by said A/D converting means" in lines 11-12. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 2, claim 2 recites the limitation "said known signal, for which symbol judgment is performed by said symbol judgment portion" in lines 13-14. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 3, claim 3 recites the limitation "said known signal serial converted by said P/S converter" in lines 15-16. There is insufficient antecedent basis for this limitation in the claim. Further, it is not clear the limitation "the digital signal(s)"

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(line 11 and line 13) is referred to the signal input to the symbol judgment portion or the signal input to the P/S converter.

Regarding claim 6, the limitation "said phase shifting means outputs different phase shifting amount for N time, (in which N is an integer greater than or equal to two), for detecting shifting amount to be shifted..." in lines 2-4 is not understood (emphasis added for the portion not understood). Since the phase shifting amount has been output, it is not clear how and why the phase shifting amount output for N times may be used for the purpose of detecting shifting amount.

Regarding claim 9, claim 9 recites the limitation "said information data" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 15, the limitation "a preliminary known signal being inserted in said digital transmission signal upon transmission" recited in lines 3-4 is not understood. Do you mean the known signal is inserted in the digital transmission signal once the digital transmission signal is transmitted? Further, claim 1 recites the limitation "said known signal after digital conversion by said first step" in lines 11-12. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 16, claim 16 recites the limitation "said known signal, for which symbol judgment is performed by said first sub-step" in lines 11-12. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 17, claim 17 recites the limitation "said known signal serial converted by said fourth sub-step" in line 13. There is insufficient antecedent basis for

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this limitation in the claim. Claim 17 recites the limitation "said fifth sub-step" in the last line. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 19, the limitation "said second step outputs different phase shifting amount for N time, (in which N is an integer greater than or equal to two), for detecting shifting amount to be shifted..." in lines 2-4 is not understood (emphasis added for the portion not understood). Since the phase shifting amount has already been output, it is not clear how and why the phase shifting amount output for N times may be used for the purpose of detecting shifting amount.

Regarding claim 23, claim 23 recites the limitation "said information data" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

In summary, the claims appear to be a literal translation into English from a foreign document and are generally narrative and indefinite. The applicant may need to revise the entire set of claims.

The following rejection is made based on the examiner's best understanding of the claims in view of the specification.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 9, 15 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Toy et al. (U.S. Patent No. 5,343,498, provided by the applicant in the IDS received 11/3/00, PTO Paper#4).

Regarding claims 1 and 15, Toy et al. teach a demodulation circuit (120 in Fig. 1) for demodulating a digital transmission signal, wherein

a preliminary known signal being inserted in the digital transmission signal before transmission (7, 8 in Fig. 1; col. 3, lines 12-17), said demodulation circuit comprising:

A/D converting means (114 in Fig. 1) for performing A/D conversion of a base band signal obtained by demodulation (118 in Fig. 1) of said digital transmission signal; and

Phase shifting means (50, 70, and 90 in Fig. 1) for causing phase shift of one of said digital transmission signal and said base band signal on the basis of the known signal (50, 88 in Fig. 1) extracted from the digitized base band signal.

Regarding claims 9 and 23, the digital transmission signal is a signal, in which information data and the known signal are time multiplexed (col. 3, lines 12-14 and 45-52; also see Fig. 2).

10. Claims 1, 9, 15 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsuoka et al. (U.S. Patent No. 5,809,009, provided by the applicant in the IDS received 11/3/00, PTO Paper#4).

Regarding claims 1 and 15, Matsuoka et al. teach a demodulation circuit (120 in Fig. 1) for demodulating a digital transmission signal, wherein

a preliminary known signal being inserted in the digital transmission signal before transmission (col. 10, lines 53-55), said demodulation circuit comprising:

A/D converting means (1 in Fig. 1) for performing A/D conversion of a base band signal obtained by demodulation of said digital transmission signal; and

Phase shifting means (5 in Fig. 1, col. 10, line 64 through col. 11, line 10) for causing phase shift of one of said digital transmission signal and said base band signal on the basis of the known signal (50, 88 in Fig. 1) extracted from the digitized base band signal.

Regarding claims 9 and 23, the digital transmission signal is a signal, in which information data and the known signal are time multiplexed (col. 10, lines 53-55).

11. Claims 1-3, 5, 15-17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Fujii et al. (U.S. Patent No. 5,991,344).

Regarding claims 1 and 15, Fujii et al. teach a demodulation circuit (250, 270 through 157, 158 to 210 in Fig. 1) for demodulating a digital transmission signal, wherein

a preliminary known signal being inserted in the digital transmission signal before transmission (col. 9, lines 20-23), said demodulation circuit comprising:

A/D converting means (157, 158 in Fig. 1) for performing A/D conversion of a base band signal obtained by demodulation (156 in Fig. 1) of said digital transmission signal; and

Phase shifting means (230, 220 in Fig. 1) for causing phase shift of one of said digital transmission signal and said base band signal on the basis of the known signal (col. 9, lines 5-11) extracted from the digitized base band signal.

Regarding claims 2 and 16, the demodulation circuit of Fujii et al. further comprises orthogonal demodulating means (156 in Fig. 1) for performing orthogonal demodulation of said digital transmission signal,

said A/D converting means includes two A/D converters (157, 158 in Fig. 1) for two base band signals demodulated by the orthogonal demodulation means,

symbol judgment portion (213 in Fig. 1) for making judgment of symbols of digital signals output from the A/D converters,

said phase shifting means including comparing portion (230 in Fig. 1; note that 230 is a unique word detector; also note that in order to detect the UW, it is inherent a comparison needs to be made between the received signal with the UW stored somewhere at the receiver) for comparing the known signal extracted from the output signal of the symbol judgment portion with the known signal inserted at the transmitting end, and a phase shifter for causing phase shift of the base band signal on the basis of a result of comparison by the comparing portion (220 in Fig. 1; note that, as shown in Fig. 1, the controller 220 sends a control signal to the VCO 164, which in turn controls the phase of the demodulators 270, 280 and 156).

Regarding claims 3 and 17, the demodulation circuit of Fujii et al. further comprises orthogonal demodulating means (156 in Fig. 1) for performing orthogonal demodulation of said digital transmission signal,

said A/D converting means includes two A/D converters (157, 158 in Fig. 1) for two base band signals demodulated by the orthogonal demodulation means,

symbol judgment portion (213 in Fig. 1) for making judgment of symbols of digital signals output from the A/D converters,

said phase shifting means including P/S converter (214 in Fig. 1) for converting the output signal of the symbol judgment portion, comparing portion (230 in Fig. 1; note that 230 is a unique word detector; also note that in order to detect the UW, it is inherent a comparison needs to be made between the received signal with the UW stored somewhere at the receiver) for comparing the known signal extracted from the output signal of the P/S converter with the known signal inserted at the transmitting end, and a phase shifter for causing phase shift of the base band signal on the basis of a result of comparison by the comparing portion (220 in Fig. 1; note that, as shown in Fig. 1, the controller 220 sends a control signal to the VCO 164, which in turn controls the phase of the demodulators 270, 280 and 156).

Regarding claims 5 and 19, as shown in Fig. 1 of Fujii et al., the controller 220 sends a control signal to the VCO 164, which in turn controls the phase of the demodulators 270, 280 and 156. The phase of the signal (i.e., the digital transmission signal) input to the orthogonal demodulators 156 and the phase of the signal (i.e., the

base band signal) output from the orthogonal demodulator 156 are therefore controlled by the controller 220.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujiii et al. (U.S. Patent No. 5,991,344) in view of Miya et al. (U.S. Patent No. 5,572,516).

Fujii et al. teach the claimed invention (see the rationale applied to claims 3 and 17 above), but does not teach reception data processing portion obtaining an information data by removing the known signal.

Miya et al. teaches a frame decomposition circuit (124 in Fig. 1) that reproduces the information by removing the unique word (col. 6, lines 28-32).

It is known that the unique word does not contain any information and is generally only used for synchronization purpose. It is therefore required to remove the unique word from the received signal. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a

reception data processing portion that removes the known signal to obtain the information data, since the known signal does not contain any information.

14. Claims 6, 9, 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (U.S. Patent No. 5,991,344) in view of Nakakoshi et al. (JP 08-242260, provided by the applicant in IDS received 5/14/01, PTO Paper#5).

Regarding claims 6 and 20, Fujii et al. teach the claimed invention including output a phase control signal on the basis of unique word detection (see the rationale applied to claims 1 and 15 above), but does not teach using the average of N phase control signals to control the phase shift. Nakakoshi et al. teaches using the average of plural phase correction values (9 in Figs. 1, 3, 5, 12, 14, 17, 19, 20, 21, 23) to correct the phase of a demodulator, wherein each of the phase correction values is obtained by unique word detection (18-3 in Fig. 18 or 14 in Fig.21).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the average of plural phase control signals to control the phase shift, so as to prevent erroneous phase shifting of the demodulator and thereby to improve the demodulation quality.

Regarding claims 9 and 23, Fujii et al. teach the claimed invention (see the rationale applied to claims 1 and 15 above), but does not particularly teach that the information data and the known signal (i.e., unique word) are time multiplexed. However, it is common in the art that the information data and the unique word are time multiplexed to form the transmission signal so as to use the unique word to periodically

synchronize the receiver with the transmitter. Nakakoshi et al. shows that the information data and the unique word are time multiplexed to form the transmission signal (see Figs. 10, 15, 16, 24, and 29). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to time-multiplex the information data and the known signal, so as to use the known signal to periodically synchronize the receiver with the transmitter.

15. Claims 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (U.S. Patent No. 5,991,344) in view of Nakakoshi et al. (JP 08-242260, provided by the applicant in IDS received 5/14/01, PTO Paper#5) as applied to claims 6 and 20 above, and further in view of Petranovich (U.S. Patent No. 5,625,652).

Fujii et al. in view of Nakakoshi et al. teach the claimed invention, but fail to describe the detail of the unique word detector, which correlates the known signal extracted from the output signal of the A/D conversion means with the known signal inserted at the transmitting end, and outputs a detect signal when correlation value is highest. However, it is well known in the art that a detector uses a correlation technique to indicate the detection of a certain signal (the indication of detection is obviously associated with the highest correlation value, which represent most similarity).

Petranovich teaches a unique word detector (52 in Fig. 7) that correlates the decoded data (output from 50 in Fig. 1) with the predefined unique word (col. 4, lines 35-41).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that the UW detector 230 of Fujii correlates the

received data with the unique word inserted at the transmitted end and outputs the detection signal to the controller 220 at the highest correlation value, since the highest correlation value represents the most similarity between the received data and the unique word.

16. Claims 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (U.S. Patent No. 5,991,344) in view of Odenwalder et al. (U.S. Patent No. 6,480,521) and Sawahashi et al. (U.S. Patent No. 5,694,388).

Fujii et al. teach the claimed invention (see the rationale applied to claims 1 and 15 above), but does not teach that the information data is transmitted in one of the I and Q channels and the known signal is transmitted in the other of the I and Q channels.

However, it is common in the art that the known signal, such as pilot signal, unique word etc., and the information data are transmitted at separate channels. Odenwalder et al. teach that the pilot signal may be transmitted solely on either the I or Q channels (col. 8, lines 55-56). Sawahashi et al. teach transmitting the pilot signal and the information data on separate channels (Fig. 12). The pilot signal is transmitted continuously on the pilot channel to achieve good tracking ability to the Rayleigh fading (col. 29, lines 17-21). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to transmit the information data on one of the I and Q channels, and transmit the known signal on the other of the I and Q channels, so as to achieve good tracking ability on the Rayleigh fading.

17. Claims 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toy et al. (U.S. Patent No. 5,343,498, provided by the applicant in the IDS received 11/3/00, PTO Paper#4) in view of Odenwalder et al. (U.S. Patent No. 6,480,521) and Sawahashi et al. (U.S. Patent No. 5,694,388).

Toy et al. teach the claimed invention (see the rationale applied to claims 1 and 15 above), but does not teach that the information data is transmitted in one of the I and Q channels and the known signal is transmitted in the other of the I and Q channels.

However, it is common in the art that the known signal, such as pilot signal, unique word etc., and the information data are transmitted at separate channels. Odenwalder et al. teach that the pilot signal may be transmitted solely on either the I or Q channels (col. 8, lines 55-56). Sawahashi et al. teach transmitting the pilot signal and the information data on separate channels (Fig. 12). The pilot signal is transmitted continuously on the pilot channel to achieve good tracking ability to the Rayleigh fading (col. 29, lines 17-21). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to transmit the information data on one of the I and Q channels, and transmit the known signal on the other of the I and Q channels, so as to achieve good tracking ability on the Rayleigh fading.

18. Claims 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. (U.S. Patent No. 5,809,009, provided by the applicant in the IDS received 11/3/00, PTO Paper#4) in view of Odenwalder et al. (U.S. Patent No. 6,480,521) and Sawahashi et al. (U.S. Patent No. 5,694,388).

Matsuoka et al. teach the claimed invention (see the rationale applied to claims 1 and 15 above), but does not teach that the information data is transmitted in one of the I and Q channels and the known signal is transmitted in the other of the I and Q channels.

However, it is common in the art that the known signal, such as pilot signal, unique word etc., and the information data are transmitted at separate channels. Odenwalder et al. teach that the pilot signal may be transmitted solely on either the I or Q channels (col. 8, lines 55-56). Sawahashi et al. teach transmitting the pilot signal and the information data on separate channels (Fig. 12). The pilot signal is transmitted continuously on the pilot channel to achieve good tracking ability to the Rayleigh fading (col. 29, lines 17-21). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to transmit the information data on one of the I and Q channels, and transmit the known signal on the other of the I and Q channels, so as to achieve good tracking ability on the Rayleigh fading.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Asahara et al. (U.S. Patent No. 6,631,174).

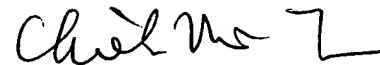
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-

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0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM,
Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



Chieh M Fan
Examiner
Art Unit 2634

cmf
November 13, 2003